



# Methodological Evaluation of District Hospitals Systems in Rwanda Using Multilevel Regression Analysis for Efficiency Measurement

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## Abstract

District hospitals in Rwanda play a critical role in healthcare delivery, particularly in underserved areas. However, their efficiency and effectiveness have not been systematically evaluated. The review employs a comprehensive search strategy across multiple databases to identify relevant studies. Multilevel regression analysis is used to account for both hospital and patient-level factors that influence system performance. Findings from the reviewed studies suggest that district hospitals in Rwanda face significant operational challenges, with average efficiency scores indicating room for improvement despite some notable exceptions. The multilevel regression model reveals complex interdependencies between different levels of healthcare delivery and patient outcomes, highlighting areas where interventions could be targeted to enhance system performance. Based on the findings, recommendations are provided for policy makers to consider structural reforms and resource allocation strategies aimed at improving district hospital efficiency in Rwanda. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *African geography, district hospitals, multilevel models, regression analysis, efficiency measurement, health economics, resource allocation*

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